

ABSTRACT OF THE DISCLOSURE

A high voltage LDMOS transistor according to the present invention includes a P-field and divided P-fields in an extended drain region of a N-well. The P-field and divided P-fields form junction-fields in the N-well, in which a drift region is fully depleted before breakdown occurs. Therefore, a higher breakdown voltage is achieved and a higher doping density of the N-well is allowed. Higher doping density can effectively reduce the on-resistance of the LDMOS transistor. Furthermore, the N-well generated beneath a source diffusion region provides a low-impedance path for a source region, which restrict the transistor current flow in between a drain region and a source region.